## REMARKS

Claims 1, 6, 16 and 31 are amended. Claims 1-42 are in the application.

Certain independent claims are amended to remove reference to volatility and recite a chalcogenide comprising device. Such is clearly supported by the specification as filed.

Action on the merits is requested.

Respectfully submitted,

Dated: 8-20-02

By: _____
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Patent Application Serial No. ..... 09/943,190
Filing Date ..... August 29, 2001
Inventorship ..... Kristy A. Campbell et al.
Assignee ..... Micron Technology, Inc.
Group Art Unit ..... 2818
Examiner ..... Unknown
Attorney's Docket No. ..... MI22-1668
Title: Method of Forming Chalcogenide Comprising Devices, Method of Forming a Programmable Memory Cell of Memory Circuitry, and a Chalcogenide Comprising Device (as amended)

**VERSION WITH MARKINGS TO SHOW CHANGES MADE ACCOMPANYING PRELIMINARY AMENDMENT SUBSEQUENT TO AUGUST 29, 2001 FILING DATE**

**In the Title**:

The title has been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

Method Of Forming ~~Non-Volatile Resistance Variable~~ Chalcogenide Comprising Devices, Method Of Forming A Programmable Memory Cell Of Memory Circuitry, And A ~~Non-Volatile Resistance Variable~~ Chalcogenide Comprising Device

**In the Claims**

The claims have been amended as follows. Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

1. (Amended) A method of forming a ~~non-volatile resistance variable~~ chalcogenide comprising device, comprising:

forming a first conductive electrode material on a substrate;

forming an amorphous chalcogenide comprising material to a first thickness over the first conductive electrode material, the chalcogenide material comprising $A_xB_y$, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

forming a metal comprising layer to a second thickness over the chalcogenide material; the metal comprising layer defining some metal comprising layer transition thickness for the first thickness of the chalcogenide comprising material such that when said transition thickness is met or exceeded, said metal comprising layer when diffused within said chalcogenide comprising material transforms said chalcogenide comprising material from an amorphous state to a crystalline state; the second thickness being less than but not within 10% of said transition thickness;

irradiating the metal effective to break a chalcogenide bond of the chalcogenide material at an interface of the metal and chalcogenide material and diffuse at least some of the metal into the chalcogenide material, and said chalcogenide comprising material remaining amorphous after the irradiating; and

after the irradiating, depositing a second conductive electrode material over the chalcogenide material, and which is continuous and completely covering at least over the chalcogenide material, and forming the second conductive electrode material into an electrode of the device.

6. (Amended) The method of claim 1 comprising forming the ~~non-volatile resistance variable~~ device into a programmable memory cell of memory circuitry.

16. (Amended) A method of forming a ~~non-volatile resistance variable~~ chalcogenide comprising device, comprising:

forming a first conductive electrode material on a substrate;

forming an amorphous chalcogenide comprising material to a first thickness over the first conductive electrode material, the chalcogenide material comprising $A_xB_y$, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

forming a metal comprising layer to a second thickness less than the first thickness over the chalcogenide comprising material;

irradiating the metal effective to break a chalcogenide bond of the chalcogenide material at an interface of the metal and chalcogenide material and diffuse at least some of the metal into the chalcogenide comprising material, and said chalcogenide comprising material remaining amorphous after the irradiating, the chalcogenide comprising material after the irradiating having a first region which is displaced from the interface at least by an interface region having a higher content of "A" than the first region; and

after the irradiating, forming a second electrode material operatively proximate the chalcogenide material.

31. (Amended) A ~~non-volatile resistance variable~~ chalcogenide comprising device comprising:

a substrate having a first electrode formed thereover;

a ~~resistance variable~~ chalcogenide comprising material having metal ions diffused therein received operatively adjacent the first electrode, the chalcogenide material comprising $A_xB_y$, where "B" is selected from the group consisting of S, Se and Te and mixtures thereof, and where "A" comprises at least one element which is selected from Group 13, Group 14, Group 15, or Group 17 of the periodic table;

a second electrode received operatively adjacent the ~~resistance variable~~ chalcogenide comprising material; and

the second electrode and ~~resistance variable~~ chalcogenide comprising material operatively connecting at an interface, the chalcogenide comprising material having a first region which is displaced from the interface at least by a chalcogenide material interface region having a higher content of "A" than the first region.

**-END OF DOCUMENT-**